



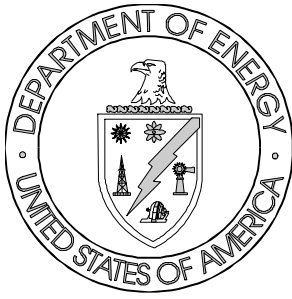
**U.S. Department of Energy  
Technical Qualification Program**

# ***Emergency Management Topical Area***

## **Study Guide**

<p><b>Section 5.0 Topical Competencies</b></p>
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**May 1996**



U.S. Department of Energy  
Technical Qualification Program

# *Emergency Management Topical Area*

## **Study Guide**

For the

*Chemical Processing  
Qualification Standard*

**May 1996**



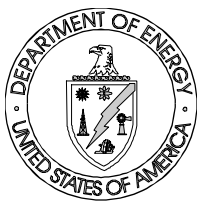
**Competency 2.3 Chemical Processing personnel shall demonstrate a familiarity level knowledge of Department of Energy, DOE Order 5000.3B, Occurrence Reporting and Processing of Operations Information.**

**1. Supporting Knowledge and Skills**

- a. State the purpose of DOE Order 5000.3B, Occurrence Reporting and Processing of Operations Information.
- b. Define the following terms:
  - Event
  - Condition
  - Facility
  - Notification report
  - Occurrence report
  - Reportable occurrence
- c. Discuss the Department's policy regarding the reporting of occurrences as outlined in the DOE Order 5000.3B, Occurrence Reporting and Processing of Operations Information.
- d. State the different categories of reportable occurrences and discuss each.
- e. Refer to Attachment 1 of Order 5000.3B, Occurrence Reporting and Processing of Operations Information, and discuss the role of chemical processing-related reportable occurrences.

**2. Self-Study Activities (corresponding to the intent of the above competency)**

NOTES: • The DOE Orders are in a state of transition. Please refer to the following gopher site for a cross reference of new and old Orders:  
gopher://VM1.HQADMIN.DOE.GOV:70/00/doemenu1/directiv/251cross.asc



## Section 5.0

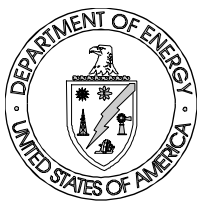
- Below are two web sites containing many of the references you may need.

Web Sites		
Organization	Site Location	Notes
Department of Energy	<a href="http://cted.inel.gov/cted/index.html">http://cted.inel.gov/cted/index.html</a>	DOE Standards, Guides, and Orders.
U.S. House of Representatives	<a href="http://law.house.gov/cfr.htm">http://law.house.gov/cfr.htm</a>	Searchable Code of Federal Regulations

**Read** DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*.

**Read** at least two occurrence reports involving facilities at your site. If possible, these should involve electrical system activities as at least a contributing factor to the cause of the occurrences.

- EXERCISE 2.3-A State the purpose of DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*.
- EXERCISE 2.3-B Define “Reportable Occurrence” and the rationale associated with reporting as identified in DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*.
- EXERCISE 2.3-C Referring to DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*, describe three categories of Reportable Occurrences and provide an example of the types of events that could lead to each.
- EXERCISE 2.3-D Describe the elements of the occurrence report.
- EXERCISE 2.3-E List three of the seven categories of causes.
- EXERCISE 2.3-F For the two occurrence reports you reviewed, identify and highlight the root cause and corrective action sections. How will facility management know if the corrective action is actually “correct”?



### 3. Summary

DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*, establishes a system for reporting of operations information related to DOE-owned or -operated facilities and processing of that information to provide for appropriate corrective action.

The Order describes the requirements for reporting and processing of occurrences related to the operation of DOE-owned or -operated facilities, including occurrences related to safety, health, security, property, operations, or the environment, up to and including emergencies.

### 4. Exercise Solutions

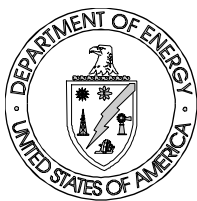
EXERCISE 2.3-A State the purpose of DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*.

ANSWER 2.3-A “1. PURPOSE. To establish a system for reporting of operations information related to DOE-owned or operated facilities and processing of that information to provide for appropriate corrective action in accordance with the policy set forth in Paragraph 6 of this Order” (DOE Order 5000.3B).

EXERCISE 2.3-B Define “Reportable Occurrence” and the rationale associated with reporting as identified in DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*.

ANSWER 2.3-B Reportable Occurrences are events or conditions that (1) affect the health and safety of the public, (2) seriously impact the intended purpose of DOE facilities, (3) have a noticeable adverse effect on the environment, (4) endanger the health and safety of workers, or (5) adversely affect national security or the security interests of DOE.

EXERCISE 2.3-C Referring to DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information*, describe three categories of Reportable Occurrences and provide an example of the types of events that could lead to each.

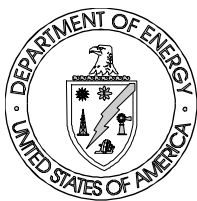


ANSWER 2.3-C

Types, Definitions, and Examples of Reportable Occurrences		
Type	Definition	Example
Emergencies	The most serious occurrences; require an increased Alert status for on-site personnel and, in specified cases, for off-site authorities.	<ul style="list-style-type: none"><li>a) any unintentional nuclear criticality that results or could result in actual or potential facility damage or release of radioactive material to the environment;</li><li>b) any actual or potential release of material to the environment that results or could result in significant off-site consequences;</li><li>c) any natural or man-made event posing an actual or potential threat to the integrity of the facility that results or could result in significant off-site consequences;</li><li>d) any event in process or having occurred that involves an actual or potential substantial degradation of the level of the safety of the facility that results or could result in significant off-site consequences;</li><li>e) any safeguards or security event that is an actual or potential threat to DOE operations, facilities, or personnel, and results or could result in significant effects on the public health and safety/or on national security; or</li><li>f) any event that requires activation of the site emergency plan.</li></ul>



Types, Definitions, and Examples of Reportable Occurrences		
Type	Definition	Example
Unusual Occurrence	A nonemergency event that has significant impact or potential for impact on safety, the environment, health, security, or operations.	<ul style="list-style-type: none"> <li>a) result in the release of radioactive or hazardous materials above limits established in, or in violation of, safety, environmental, or health requirements defined in Federal permits, Federal regulations, or DOE standards;</li> <li>b) present significant internal or external threats to safety, the environment, health protection, or the ability of a facility to operate;</li> <li>c) involve significant degradation of safety class equipment or environmental, safety, security, or health conditions;</li> <li>d) result in fatalities, exposures to hazardous or radioactive materials or off-site or on-site contamination that do not meet emergency criteria defined in DOE Order 5500.2, but are in excess of regulatory limits, failure of environmental monitoring equipment necessary to demonstrate compliance, failure of safety equipment or systems reducing the capability below a minimum required safety function, or significant delay or cost in operations;</li> <li>e) result in the actuation of emergency systems or engineered safety features, except under approved testing;</li> <li>f) violate technical safety requirements, or involve an unreviewed safety question;</li> <li>g) violate DOE safety requirements, environmental requirements, or result in the loss of control or release of radioactive material above allowable limits;</li> <li>h) result in the release of a hazardous substance or material that exceeds a reportable quantity and is not Federally permitted as defined in Attachment I of DOE Order 5000.3; or</li> <li>i) result in failure or significant degradation of administrative controls that are required to ensure safety, security, or environmental protection.</li> </ul>



Types, Definitions, and Examples of Reportable Occurrences		
Type	Definition	Example
Off-Normal Occurrence	An abnormal or unplanned event or condition that adversely affects, potentially affects, or is indicative of degradation in the safety, security, environmental, or health protection performance or operation of a facility.	<ul style="list-style-type: none"><li>a) result in the release of radioactive or hazardous materials below limits established by Federal permits, Federal regulations, or DOE standards, but must be reported in writing to state or local agencies in other than routine monthly/quarterly reports;</li><li>b) are internal or external threats to safety, security, environmental, or health protection or the ability of a facility to operate;</li><li>c) involve degradation of environmental, safety, security, or health conditions;</li><li>d) result in serious personnel injury or significant lost workdays, personnel contamination, assimilation, exposure, or significant on-site or off-site contamination of hazardous or radioactive materials in excess of administrative limits but within regulatory limits, or degradation of environmental monitoring equipment necessary to demonstrate compliance;</li><li>e) result in violation of safety, environmental, or health administrative limits;</li><li>f) involve operational procedural violations, including maintenance and administrative procedures that have the potential to impact the safety, security, environmental, or health performance or operation of a facility; or</li><li>g) involve discovery of a condition that could prevent the functioning of administrative controls necessary to ensure safety or environmental protection.</li></ul>

EXERCISE 2.3-D Describe the required elements of the occurrence report.

ANSWER 2.3-D For every Reportable Occurrence, the Facility Manager shall determine and document the following in the occurrence report:

- a) the significance, nature, and extent of the event or condition;
- b) the cause(s) of the event or condition, including the root cause, as appropriate; and
- c) the corrective actions to be taken to correct the condition and prevent recurrence.





EXERCISE 2.3-E List three of the seven categories of causes.

ANSWER 2.3-E Categories of causes:

1. Equipment/material problem
2. Procedure problem
3. Personnel error
4. Design problem
5. Training deficiency
6. Management problem
7. External phenomenon

EXERCISE 2.3-F For the two occurrence reports you reviewed, identify and highlight the root cause and corrective action sections. How will facility management know if the corrective action is actually “correct”?

ANSWER 2.3-F Primarily by monitoring the corrective action or any performance indicators corresponding to this corrective action; also if the occurrence does not “occur” again.



**Competency 2.11** Chemical processing personnel shall demonstrate a familiarity level knowledge of the following emergency management related Department of Energy (DOE) Orders:

- DOE Order 5500.1, Emergency Management System
- DOE Order 5500.2, Emergency Categories, Classes, and Notification and Reporting Requirements
- DOE Order 5500.3, Planning and Preparedness for Operational Emergencies
- DOE Order 5500.7, Emergency Operating Records Protection Program
- DOE Order 5500.10, Emergency Readiness Assurance Program

**1. Supporting Knowledge and Skills**

- a. Describe the Orders listed above.
- b. Discuss the general roles and responsibilities of the departmental elements for management of the Department's Emergency Management System.
- c. Define "Operational Emergencies" and the circumstances to which they apply.
- d. Discuss the classes of hazards contained in DOE Order 5500.1, Emergency Management System.
- e. Discuss the Department's three-tiered(sic) organizational approach to managing Operational Emergencies.
- f. Describe the purpose of an Emergency Readiness Assurance Plan.

**2. Self-Study Activities (corresponding to the intent of the above competency)**

NOTES: • The DOE Orders are in a state of transition. Please refer to the following gopher site for a cross reference of new and old Orders:  
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## Section 5.0

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U.S. House of Representatives	<a href="http://law.house.gov/cfr.htm">http://law.house.gov/cfr.htm</a>	Searchable Code of Federal Regulations

**Read** the DOE Orders listed above.

- EXERCISE 2.11-A Referring to the Orders listed above, identify the purpose and scope statements.
- EXERCISE 2.11-B Identify the role of the field element in an emergency.
- EXERCISE 2.11-C Describe the organization and function of the Headquarters (HQ) emergency management team (EMT).
- EXERCISE 2.11-D Define “operational emergencies” and the circumstances to which they applies.
- EXERCISE 2.11-E Discuss the classes of hazards contained in DOE Order 5500.1B, *Emergency Management System*.
- EXERCISE 2.11-F Discuss the Department’s three-tiered organizational approach to managing Operational Emergencies.
- EXERCISE 2.11-G Describe the purpose of an Emergency Readiness Assurance Plan.



### 3. Summary

It is the purpose of DOE Orders to establish a framework for the Department's EMS.

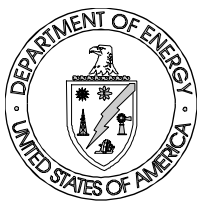
DOE Order 5500.1B, *Emergency Management System*, establishes the overall policy and requirements of the EMS. The Order states that the Under Secretary is the senior official for the EMS and convenes the HQ EMT. The HQ EMT is a team formed to manage response actions during emergencies involving DOE facilities or requiring DOE assistance. The EMAC is also established by this Order and supports the Director of Emergency Operations (DEO) in the development of specific policy and technical recommendations. Specific responsibilities are spelled out in this Order for Facility Managers, heads of field elements, and HQ Program Secretarial Officers (Program Senior Officials [PSOs]).

DOE Order 5500.2B, *Emergency Categories, Classes, and Notification and Reporting Requirements*, establishes standard terminology for operational and energy emergencies. Operational emergencies are further classified as an Alert, a Site Area Emergency, or General Emergency according to the severity of the impact of the event. This Order also establishes a reporting requirement for emergency events.

DOE Order 5500.3A, *Planning and Preparedness for Operational Emergencies*, establishes the hazards assessment as the technical basis upon which all emergency management programs are developed. The Order states the requirements for planning and preparedness for operational emergencies and describes the 13 program elements of an emergency management program.

DOE Order 5500.7B, *Emergency Operating Records Protection Program*, establishes policies, responsibilities, and requirements to ensure the safeguarding of the core of records deemed necessary to ensure continuity of governmental activities following disasters and attack-related emergency conditions. The Order provides regulatory guidance on acceptable storage locations, manner of storage, and disposition of emergency operating records.

DOE Order 5500.10, *Emergency Preparedness Assurance Program*, establishes requirements for the Emergency Readiness Assurance Program, the goal of which is to ensure that the EMS is ready to respond promptly, efficiently, and effectively to any emergency involving DOE facilities or requiring DOE assistance. The program includes a requirement for development of a five-year ERAP. The Order requires an appraisal program to ensure that stated emergency capabilities are sufficient to implement emergency plans and that appropriate and timely improvements are made.

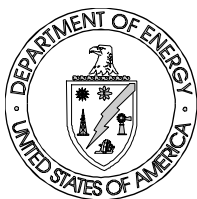


#### 4. Exercise Solutions

EXERCISE 2.11-A Referring to the Orders listed above, identify the purpose and scope statements.

ANSWER 2.11-A

Purpose and Scope of Selected DOE Orders Related to Emergency Management		
Order	Purpose	Scope
<b>5500.1B</b> <i>Emergency Management System</i>	To establish overall policy and requirements for the Department of Energy (DOE) Emergency Management System (EMS). The EMS provides the framework for development, coordination, and direction of planning, preparedness, and readiness assurance activities. This Order addresses responses to Operational, Energy, and Continuity of Government (COG) Emergencies involving DOE or requiring DOE assistance.	The provisions of this Order apply to all DOE Elements and contractors performing work for DOE as provided for by law and/or contract and as implemented by the appropriate contracting officer.
<b>5500.2B</b> <i>Emergency Categories, Classes, and Notification and Reporting Requirements</i>	To establish Department of Energy (DOE) emergency categories, classes, and notification and reporting requirements to facilitate the communication and reporting of emergency events.	The provisions of this Order apply to all DOE Elements and contractors performing work for DOE as provided for by law and/or contract and as implemented by the appropriate contracting officer.
<b>5500.3A</b> <i>Planning and Preparedness for Operational Emergencies</i>	To establish requirements for planning and preparedness for Operational Emergencies involving the Department of Energy (DOE) or requiring DOE assistance.	The provisions of this Order apply to all DOE Elements and contractors performing work for DOE as provided for by law and/or contract and as implemented by the appropriate contracting officer.



Purpose and Scope of Selected DOE Orders Related to Emergency Management		
Order	Purpose	Scope
<b>5500.7B</b> <i>Emergency Operating Records Protection Program</i>	To establish the policy, responsibilities, and requirements for a Departmental Emergency Operating Records Protection Program to safeguard that core of records deemed necessary to assure continuity of essential Governmental activities during and following disaster and attack-related emergency conditions.	The provisions of this Order apply to all Departmental elements and to covered contractors to the extent implemented under a contract or other agreement. A covered contractor is a seller of supplies or services involving the management of an emergency operations center under a management and operating contract or subcontracts thereunder.
<b>5500.10B</b> <i>Emergency Readiness Assurance Program</i>	To establish the requirements of the Emergency Readiness Assurance Program with a goal of assuring that the Department of Energy (DOE) Emergency Management System (EMS) is ready to respond promptly, efficiently, and effectively to any emergency involving DOE facilities or requiring DOE assistance.	The provisions of this Order apply to all DOE Elements and contractors performing work for DOE as provided for by law and/or contract and as implemented by the appropriate contracting officer.

EXERCISE 2.11-B Identify the role of the field element in an operational emergency.

ANSWER 2.11-B During an operational emergency, the cognizant field element is responsible for the following:

1. Ensuring prompt initial notification to state, tribal, and local governments and others, as appropriate
2. Ensuring proper response by Facility Managers to any emergency within their facilities
3. Providing additional technical assistance and support
4. Monitoring the facility response activities and recommending additional actions, as necessary
5. Predesignating an On-Scene Coordinator for Federal responses under the National Contingency Plan (NCP)



6. Ensuring emergency response actions are coordinated with the cognizant local, state, tribal, and Federal regional organizations
7. Coordinating additional DOE and other Federal agency resources, as required
8. Overseeing the local investigation and closeout of the occurrence, in accordance with the HQ Program Manager

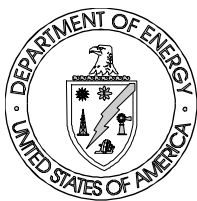
EXERCISE 2.11-C Describe the organization and function of the EMT at the HQ level.

ANSWER 2.11-C The HQ EMT consists of an executive team and a technical operations cadre. The executive team provides strategic direction to the response and evaluates the broad impacts of the emergency on the DOE complex. The executive team is normally chaired by the Under Secretary, with the cognizant PSO serving as the Deputy Chair.

The technical operations cadre, which consists of several designated PSOs for nuclear and nonnuclear programs, provides oversight to the field element; coordinates with other Federal agencies; and provides information to the press, Congress, and other Federal agencies.

EXERCISE 2.11-D Define “operational emergencies” and the circumstances to which they apply.

ANSWER 2.11-D Operational emergencies are significant accidents, incidents, events, or natural phenomena that seriously degrade the safety or security of DOE facilities. Operational emergencies apply to DOE reactors and other DOE facilities (nuclear and nonnuclear) involved with hazardous materials; DOE-controlled nuclear weapons, components, or test devices; DOE safeguards and security events; and transportation accidents involving hazardous materials.



## Section 5.0

EXERCISE 2.11-E Discuss the classes of hazards contained in DOE Order 5500.1B, *Emergency Management System*.

ANSWER 2.11.E

The Three Classes of Operational Emergencies	
Class	Description*
Alert	Any release of hazardous material (rad or non-rad) expected to be limited to small fractions of the PAG or ERPG exposure levels.
Site Area Emergency	Any release of hazardous material (rad or non-rad) expected to exceed the PAG or ERPG exposure levels on site, but not expected to exceed the PAG or ERPG levels off site.
General Emergency	Any release of hazardous material (rad or non-rad) that can reasonably be expected to exceed the PAG or ERPG exposure levels off site.

\*In terms of potential release of hazardous material at a nonreactor nuclear facility

EXERCISE 2.11-F Discuss the Department's three-tiered organizational approach to managing Operational Emergencies.

ANSWER 2.11-F The three tiered approach describes the three levels of response to an operational emergency event. Different response activities occur at the facility/site level, the DOE Operations Office (or Area Office or DOE Site Office as applicable), and the DOE Headquarters Emergency Operations Center (including appropriate Program Offices).

Response activities to mitigate the emergency are taken at the facility level. The facility notifies the Operations Office and the DOE Headquarters EOC. The Operations Office oversees the facility response and makes notifications to state and local jurisdictions as well as notifies the HQ EOC and keeps the HQ EOC informed of events at the facility. The Headquarters EOC may be activated and may convene a headquarters level Emergency Management Team to address emergency issues at the national level and will provide support (national assets, technical assistance, etc.) to the facility through the Operations Office.





EXERCISE 2.11-G Describe the purpose of an Emergency Readiness Assurance Plan.

ANSWER 2.11-G “. . . assuring that the Department of Energy (DOE) Emergency Management System (EMS) is ready to respond promptly, efficiently, and effectively to any emergency involving DOE facilities or requiring DOE assistance.” (DOE Order 5500.10, Section 1).